

REMARKS

Independent claims 1, 12 and 18 have been amended to specify that the phenol resins of the invention consist essentially of a reaction product obtained by a process consisting essentially of reacting phenolic compounds with formaldehyde and/or formaldehyde-forming compounds. The Applicants respectfully submit that the above amendment adding “consisting essentially of” after the preamble limits the independent claims to the specified elements “and those that do not materially affect the basic and novel characteristic(s)” of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original); *see* MPEP § 2111.03. For the reasons already of record and discussed again below, the lignin-modified resole resins of Doering are chemically different than the phenol resins of the claimed invention, and the reaction of phenolic compounds with formaldehyde and/or formaldehyde-forming compounds in the presence of an alkaline material would materially affect the basic and novel characteristic of the claimed invention, and thus are specifically excluded by the amendment.

Applicants also submit that support for the amendment to claim 3 can be found in Table 4 on page 8 of the specification.

Claims 1-6, 9-12 and 18-20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. patent 5,202,403 to Doering. It is respectfully submitted that the rejection is overcome by the instant amendment. Particularly, Doering relates to resole resins, i.e. thermosetting resins obtained by the base-catalyzed reaction of a phenol and formaldehyde, which are different than the phenol resins of the claimed invention. Applicants do not claim resole resins, and the Applicants claimed phenol resins are chemically different than the resole resins of Doering.

Doering teaches a lignin-modified phenol-formaldehyde resole resin useful in preparing an adhesive composition for bonding veneer sheets to make plywood or other laminated wood products together (see column 3, lines 12-15). Doering teaches forming an alkaline phenol-formaldehyde precursor resin, i.e. a resole, where phenol and formaldehyde are reacted in the presence of an alkaline material. This alkaline precursor is then reacted with lignin to form a lignin-modified phenol-formaldehyde precursor resin, forming an adhesive that is useful in bonding wood chips, veneers and sheets of plywood. This alkaline material is mandatory and forms part of the resin, and the phenol and formaldehyde are not reacted without the alkaline being present. As stated at col. 4, lines 38-57 of Doering, the precursor resins taught by Doering that are not yet modified with lignin are *alkaline* phenol-formaldehyde resins that are chemically different than the claimed phenol resins. Particularly, the claimed phenol resins are not alkaline resole resins, and the claimed phenol resins are not formed by reacting phenol and formaldehyde in the presence of an alkaline material such as alkali metal hydroxides, alkaline earth metal hydroxides, alkali metal carbonates or alkali lignin. Both the alkaline phenol-formaldehyde precursor resin as well as the lignin-modified phenol-formaldehyde precursor resin product are chemically different than the claimed phenol resins.

Applicants further refer the Examiner to col. 5, lines 3-7 where Doering references the formation of an aqueous reaction mixture including phenol, formaldehyde and an alkaline material, where the aqueous reaction mixture has a mandatory pH above 7. Doering does not teach any reaction mixture or resin product that includes only phenol and formaldehyde, and more particularly, wherein the phenol resin has a polydispersity of maximally 1.85 and a weight average molecular weight (M_w) of maximally 600.

In the Final Rejection, the Examiner states that the claimed invention does not exclude a resole resin, a reaction in the presence of an alkaline material, or a reaction including materials or compositions other than phenol and formaldehyde. To address the Examiner's concerns, Applicants respectfully submit that these components/steps are now specifically excluded by the added "consisting essentially of" claim language.

Doering fails to teach or suggest such phenol resins, fails to teach the claimed method for forming moulded products with the phenol resin of claim 1, and fails to teach moulded products having a core of solid inert parts impregnated with the phenol resin according to claim 1. As illustrated by the Comparative and Inventive Examples of the invention, failing to follow the claimed parameters will materially affect the basic and novel characteristic of the claimed invention. For example, from the Examples and Tables 1-6 on pages 6-12 of the specification, it is illustrated that the use of a paper weight of e. g. 300 g/m^2 for a resin obtained from pure phenol (see Comparative Example 1) having a polydispersity ranging from 1.91 to 2.26 leads to an unacceptable impregnation quality, in spite of the fact that the weight average molecular weight is less than 600. On the other hand, if a 50: 50 wt. % mixture of bisphenol A and phenol is used as the starting material for preparing phenol resin (see Example 1), a good impregnation quality is obtained at a polydispersity of 1.68 and an M_w of less than 500, using a paper weight of 300 g/m^2 . According to Example 2, a good impregnation quality is obtained for a paper weight of 300 g/m^2 if a polydispersity value of 1.72 is used, using a 30:70 wt. % mixture of low-polymeric phenols and phenol as the starting material. From Table 4 it follows that the further reduction to 40% of the weight percentage of phenol in the starting material mixture having a composition of low- polymeric phenols and phenol leads to a lower polydispersity value, wherein a polydispersity of 1.55 and an M_w of less than 450 leads to an excellent impregnation quality for a paper weight varying from 160 to 300 g/m^2 . When the amount of phenol in a starting material consisting of a 90:10 wt. % mixture of low-polymeric phenols and phenol is reduced even further (see Example 4), it appears that a polydispersity value of 1.86 leads to a mediocre impregnation quality for a paper weight of 254 g/m^2 and a passable impregnation quality for a paper weight of 215 g/m^2 . Table 6 clearly shows that a polydispersity lower than 1.85 in combination with an M_w higher than 600 leads to an unsatisfactory result. Generally, an unsatisfactory result means a molded product having poor impregnation quality and thus having significantly inferior characteristics such as lower mechanical strength, a higher water absorption and a increased tendency to form blisters, particularly when such a product is used under severe

conditions, such as a relative humidity of 100% and high temperatures, in comparison to a molded product having good impregnation quality.

Applicants respectfully urge that even though the Examiner proposes that the claimed invention does not exclude a resolite resin, a reaction in the presence of an alkaline material, or a reaction including materials or compositions other than phenol and formaldehyde, such modifications encompassed by the Examiner's open ended interpretation would materially affect the basic and novel characteristics of the invention and thus are now effectively excluded by the instant amendment.

With particular regard to claims 4 and 5, the Examiner has not shown where Doering describes or teaches a phenol resin having a weight percentage of phenol in the phenolic compounds that is maximally 95%, or particularly between 25% and 75%.

With particular regard to claim 6, the Examiner has not shown where Doering describes or teaches a phenol resin comprise bisphenols and polyphenols.

With particular regard to claims 9 and 10, the Examiner has not shown where Doering describes or teaches a phenol resin where the conversion of phenolic compounds, formaldehyde and/or formaldehyde-forming compounds is at least 75% or at least 90%.

With particular regard to claim 11, the Examiner has not shown where Doering describes or teaches a phenol resin that comprises one or more components selected from the group consisting of fire retardants, plasticisers, fillers, colorants and binders. To be sure, Doering describes lignin-modified resins including an additional component such as fillers. However, Doering fails to teach a non-lignin modified phenol resin as claimed that includes such additives.

With particular regard to claims 12 and 18-20, the Examiner has not shown where Doering describes or teaches a method for forming moulded products by impregnating

solid inert parts with a phenol resin, as claimed, to form an assembly, and subsequently subjecting the obtained assembly to a pressing operation at an elevated temperature and an elevated pressure so as to form moulded products. As discussed above, the final resin products produced in accordance with the teachings of Doering are lignin-modified resins that are chemically different than the phenol resins of the claimed invention. The present invention does not apply lignin at all and the present invention does not relate to an adhesive composition. Rather, the claimed invention relates to a phenol resin to be used in impregnation papers. More particularly, the present invention provides a phenol resin having a chemical-physical composition such that it is possible to use heavier impregnation papers than in the prior art for forming molded products obtained by impregnating solid inert parts, in particular impregnation paper, with phenol resin, within which impregnation papers the phenol resin distributes itself evenly, wherein said phenol resin has a polydispersity of maximally 1.85 and a weight average molecular weight (Mw) of maximally 600. These differences have been clarified by the instant amendment.

In contrast, Doering teaches adhesives that may be applied to particleboard, pressboard, plywood or the like, as well as on wood veneers and multiple panel plywoods. the lignin-modified phenol-formaldehyde precursor resin thus produced. Importantly, as described in col. 8, lines 25-55, any molded products formed with the lignin modified resin of Doering will have a Mw within the range of from about 3600 to about 14000, and an Mn within the range of from about 180 to about 250. These values are outside the range as claimed in claim 1, i.e. a weight average molecular weight (Mw) of maximally 600 and a polydispersity of maximally 1.85. Additionally, Doering discloses that the amounts of phenol and formaldehyde employed in preparing the precursor resin should be sufficient to maintain a F/P mole ratio of less than about 1.0 (see column 3, lines 65-67). In contrast, the F/P mole ratio according to the present invention is above 1.0. especially about 1.5.

For the foregoing reasons, Applicants respectfully submit that the rejection is overcome by the instant amendment and the claims are not anticipated by the Doering reference, and the rejections under 35 U.S.C. § 102(b) should be withdrawn. Such action is respectfully requested.

Claims 7-8 stand rejected under 35 U.S.C. § 103(a) as obvious over Doering. It is respectfully submitted that the rejection is incorrect or alternatively overcome by the instant amendment. The arguments about Doering from above are repeated herein. Claim 7 teaches that the phenolic compounds according to claim 1 comprise low-molecular novolacs. Claim 8 teaches that the bisphenols according to claim 6 comprise p, p-bisphenol A. Neither of said claims are anticipated by Doering and thus neither are rejected under 35 U.S.C. § 102, but the Examiner argues that it would have been obvious to one of ordinary skill in the art to produce diverse phenol resins having the desired characteristics. However, it is respectfully submitted that the Examiner has failed to establish a case of *prima facie* obviousness in the first instance. In establishing a *prima facie* case of obviousness, it is incumbent upon the Examiner to provide a reason why one of ordinary skill in the art would have been led to modify a prior art reference or to combine reference teachings to arrive at the claimed invention. See Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Int. 1985). To this end, the requisite motivation must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from the appellant's disclosure. See, for example, Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1052, 5 USPQ2d 1434, 1439 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988).

A statement that modifications of the prior art to meet the claimed invention would have been " 'well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993).

Further, there must be something in the applied references that clearly teaches or suggests that one skilled in the art should form the claimed invention upon a reading of the references, rather than the simple assumption that one could achieve the claimed invention from the teachings of the references after reading of Applicants' disclosure. *Prima facie* obviousness is a legal conclusion, not a fact, and the Examiner has provided no evidence to support the legal conclusion that it would have been obvious for one skilled in the art to arrive at the invention of claims 7 and 8.

In this regard, Applicants respectfully submit that the Examiner is reconstructing the art in light of Applicants' disclosure. The point in time that is critical for an obviousness determination is at the time the invention. "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983).

Regardless, the claims have been further distinguished from Doering by the instant amendment, and it is respectfully urged that the rejection be withdrawn. Such action is respectfully requested.

Claims 13-17 stand rejected under 35 U.S.C. § 103(a) as obvious over Doering. It is respectfully submitted that the rejection is incorrect or alternatively overcome by the instant amendment. The arguments about Doering from above are repeated herein. The Examiner argues that claims 13-17 present mere obvious matters of choice dependent on the desired final product which are not a manipulative feature or step of the claimed process. Applicants respectfully disagree. In the first instance, Applicants respectfully urge that the Examiner has not examined the claimed invention as a whole, but rather has focused on each of the individual features of the invention. It is clear from the disclosure

of Doering that their invention relates only to adhesive compositions, particularly adhesive compositions for bonding veneer sheets to make plywood or other laminated wood products together (see column 3, lines 12-15). In contrast, the claimed invention relates to a phenol resin to be used in impregnation papers, or more particularly, a phenol resin having a chemical-physical composition such that it is possible to use heavier impregnation papers than in the prior art for forming molded products obtained by impregnating solid inert parts, in particular impregnation paper, with phenol resin, within which impregnation papers the phenol resin distributes itself evenly. It is respectfully submitted that one skilled in the art would recognize that Doering is completely unrelated to the formation of impregnation paper, and would not look to modify the Doering reference as the Examiner proposes.

It is respectfully submitted that such employs the incorrect legal standard for patentability. In determining a *prima facie* case of obviousness, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification. In re Linter, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). To do so, the applied prior art must be such that it would have provided one of ordinary skill in the art with both a motivation to carry out the claimed invention and a reasonable expectation of success in doing so. See In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991); In re O'Farrell, 853 F.2d 894, 902, 7 USPQ2d 1673, 1680 (Fed. Cir. 1988). There is no such motivation in the Doering reference to modify any of claims 13-17 as the Examiner proposes.

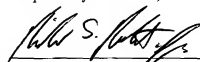
Applicants again respectfully submit that the Examiner is reconstructing the art in light of Applicants' disclosure. Obviousness cannot be determined solely after reading Applicants' teaching and an invention cannot be deemed unpatentable merely because, in a hindsight attempt to reconstruct the invention, one can find elements of it in the art. It must be shown that the invention as a whole was obvious at the time the invention was made without knowledge of the claimed invention. Where Applicants' teachings are

needed to find the invention, the invention is not obvious. Ex parte Hiyamizu, 10 U.S.P.Q.2d 1393, 1394 (PTO Bd. Pat. Ap. and Int., 1988).

Regardless, the claims have been further distinguished from Doering by the instant amendment, and it is respectfully urged that the rejection be withdrawn. Such action is respectfully requested.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the Examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "R. S. Roberts, Jr.", is written over a horizontal line.

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